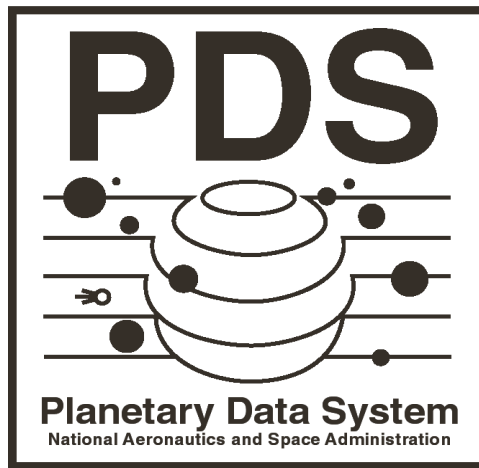


# Planetary Data System

## PDS-NSSDC Interface Test Report

March 19, 2007



Jet Propulsion Laboratory  
Pasadena, California

## **Test Summary**

This document details the test result for the PDS-NSSDC Interface Test Plan / Procedure (Version 1.0 Date: March 12, 2007). This test was conducted between January 18, 2007 to March 19, 2007. Below is a summary for each of the steps defined in the test plan. Details of the tests can be found in the Test Details section.

### ***Select Volume and Requested NSSDC Identifier***

Two volumes of data products were chosen for this test – dmgs\_1001 and dmgs\_1018. Both were data products for data set “MGS-M-MOC-NA/WA-2-SDP-L0-V1.0”. EN contacted NSSDC and acquired identifier for the test volumes.

### ***Create Checksum***

Checksum were performed and stored as baseline for volume content validation.

### ***Create AIP at EN***

The two AIPs corresponding to the two selected volumes were created successfully utilizing the MPGA software. Creation of the AIPs took approximately 40 minutes for each AIP. Each volume is approximately 4 gigabytes in size.

### ***Transfer AIP to NSSDC***

The two AIPs were successfully transferred to NSSDC via FTP. The first AIP (dmgs\_1001) took approximately 180 minutes (360 Kilobytes/Second) to transfer. The second AIP (dmgs\_1018) took approximately 180 minutes (400 Kilobytes/second) to transfer.

### ***Notify NSSDC***

The NSSDC staff was notified via e-mail upon the successful transfer.

### ***Retrieve and Store AIP at NSSDC***

This step is performed by NSSDC staff at the NSSDC.

### ***Receive Notification from NSSDC***

NSSDC staff notified JPL EN upon the completion of deep archive the two AIPs of test volumes via email.

## ***Request AIP from NSSDC and Transfer AIP to EN***

Upon receiving the confirmation email from NSSDC, PDS EN requested the two AIPs to be retrieved from the deep archive at NSSDC and be made available for download at the NSSDC FTP site. The two AIPs were successfully downloaded from NSSDC via FTP.

## ***Retrieve and Verify AIP***

The two AIPs were successfully extracted into their original volume structures. Checksum reports were generated against the extracted volume structures and compared with the original checksum reports. The comparison reported no difference found between the original volume and the extracted volume marked a successful completion of the test.

## Test Detail

This is a log file for the MPGA software beta test. Comments and explanation of steps performed to test the software are denoted in bold.

### **Summary**

Tests were run successfully on the dmjsc\_1001 and dmjsc\_1018 volume data sets.

### **Test Environment**

The tests ran on a system installed with Red Hat Enterprise Linux Workstation Release 3 as Operation System.

The MPGA software used for this test was copied from /home/mhei/MPGA on the same system and was stored under /rdata/jwang/MPGA.

/rdata is an NFS mounted disk array to the test system 'starburst'.

Two data volumes were included in this test:

Volume Id - DMGSC\_1001

Data set id: MGS-M-MOC-NA/WA-2-SDP-L0-V1.0

Size: 3.9 Gigabytes

Volume Id - DMGSC\_1018

Data set id: MGS-M-MOC-NA/WA-2-SDP-L0-V1.0

Size: 4.2 Gigabytes

### **DMGSC\_1001 Data Set Volume Test**

**Added two directories inside the MPGA software suite. One to hold MPGA execution outputs: AIP files, diagnosis file,s and log, and another directory to store checksum results.**

```
[jwang@starburst MPGA]$ cd /rdata/jwang/MPGA
```

```
[jwang@starburst MPGA]$ mkdir AIP_OUTPUT
```

```
[jwang@starburst MPGA]$ cd /rdata/jwang/MPGA/AIP_OUTPUT
```

```
[jwang@starburst AIP_OUTPUT]$ mkdir dmjsc_1001
```

```
[jwang@starburst AIP_OUTPUT]$ cd /rdata/jwang/MPGA
```

```
[jwang@starburst MPGA]$ mkdir checksum
```

```
[jwang@starburst MPGA]$ cd /rdata/jwang/MPGA/checksum
```

```
[jwang@starburst checksum]$ mkdir dmgsc_1001
```

**Get the checksums of every file in the volume DMGSC 1001 and save the results.**

```
[jwang@starburst checksum]$ cd /data/dmgsc_1001
```

```
[jwang@starburst checksum]$ md5sum * >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level1_orig.out
md5sum: mgsc_1122: Is a directory
md5sum: mgsc_1123: Is a directory
md5sum: mgsc_1124: Is a directory
md5sum: mgsc_1125: Is a directory
md5sum: mgsc_1126: Is a directory
md5sum: mgsc_1127: Is a directory
md5sum: mgsc_1128: Is a directory
```

```
[jwang@starburst checksum]$ md5sum */* >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level2_orig.out
md5sum: mgsc_1122/catalog: Is a directory
md5sum: mgsc_1122/document: Is a directory
md5sum: mgsc_1122/e01000: Is a directory
md5sum: mgsc_1122/e01001: Is a directory
md5sum: mgsc_1122/e01002: Is a directory
md5sum: mgsc_1122/e01003: Is a directory
md5sum: mgsc_1122/e01004: Is a directory
md5sum: mgsc_1122/e01005: Is a directory
md5sum: mgsc_1122/e01006: Is a directory
md5sum: mgsc_1122/e01007: Is a directory
md5sum: mgsc_1122/e01008: Is a directory
md5sum: mgsc_1122/e01009: Is a directory
md5sum: mgsc_1122/index: Is a directory
md5sum: mgsc_1122/software: Is a directory
md5sum: mgsc_1123/catalog: Is a directory
md5sum: mgsc_1123/document: Is a directory
md5sum: mgsc_1123/e01010: Is a directory
md5sum: mgsc_1123/e01011: Is a directory
md5sum: mgsc_1123/e01012: Is a directory
md5sum: mgsc_1123/e01013: Is a directory
md5sum: mgsc_1123/e01014: Is a directory
md5sum: mgsc_1123/index: Is a directory
md5sum: mgsc_1123/software: Is a directory
md5sum: mgsc_1124/catalog: Is a directory
md5sum: mgsc_1124/document: Is a directory
md5sum: mgsc_1124/e01015: Is a directory
md5sum: mgsc_1124/e01016: Is a directory
md5sum: mgsc_1124/e01017: Is a directory
```

md5sum: mgsc\_1124/e01018: Is a directory  
md5sum: mgsc\_1124/e01019: Is a directory  
md5sum: mgsc\_1124/index: Is a directory  
md5sum: mgsc\_1124/software: Is a directory  
md5sum: mgsc\_1125/catalog: Is a directory  
md5sum: mgsc\_1125/document: Is a directory  
md5sum: mgsc\_1125/e01019: Is a directory  
md5sum: mgsc\_1125/e01020: Is a directory  
md5sum: mgsc\_1125/e01021: Is a directory  
md5sum: mgsc\_1125/e01022: Is a directory  
md5sum: mgsc\_1125/index: Is a directory  
md5sum: mgsc\_1125/software: Is a directory  
md5sum: mgsc\_1126/catalog: Is a directory  
md5sum: mgsc\_1126/document: Is a directory  
md5sum: mgsc\_1126/e02000: Is a directory  
md5sum: mgsc\_1126/e02001: Is a directory  
md5sum: mgsc\_1126/e02002: Is a directory  
md5sum: mgsc\_1126/e02003: Is a directory  
md5sum: mgsc\_1126/e02004: Is a directory  
md5sum: mgsc\_1126/e02005: Is a directory  
md5sum: mgsc\_1126/index: Is a directory  
md5sum: mgsc\_1126/software: Is a directory  
md5sum: mgsc\_1127/catalog: Is a directory  
md5sum: mgsc\_1127/document: Is a directory  
md5sum: mgsc\_1127/e02006: Is a directory  
md5sum: mgsc\_1127/e02007: Is a directory  
md5sum: mgsc\_1127/e02008: Is a directory  
md5sum: mgsc\_1127/e02009: Is a directory  
md5sum: mgsc\_1127/e02010: Is a directory  
md5sum: mgsc\_1127/index: Is a directory  
md5sum: mgsc\_1127/software: Is a directory  
md5sum: mgsc\_1128/catalog: Is a directory  
md5sum: mgsc\_1128/document: Is a directory  
md5sum: mgsc\_1128/e02011: Is a directory  
md5sum: mgsc\_1128/e02012: Is a directory  
md5sum: mgsc\_1128/e02013: Is a directory  
md5sum: mgsc\_1128/e02014: Is a directory  
md5sum: mgsc\_1128/e02015: Is a directory  
md5sum: mgsc\_1128/index: Is a directory  
md5sum: mgsc\_1128/software: Is a directory

```
[jwang@starburst checksum]$ md5sum */** >  
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level3_orig.out  
md5sum: mgsc_1122/software/pcwin: Is a directory  
md5sum: mgsc_1122/software/sunos: Is a directory  
md5sum: mgsc_1123/software/pewin: Is a directory  
md5sum: mgsc_1123/software/sunos: Is a directory  
md5sum: mgsc_1124/software/pcwin: Is a directory  
md5sum: mgsc_1124/software/sunos: Is a directory  
md5sum: mgsc_1125/software/pcwin: Is a directory
```

```
md5sum: mgsc_1125/software/sunos: Is a directory
md5sum: mgsc_1126/software/pwin: Is a directory
md5sum: mgsc_1126/software/sunos: Is a directory
md5sum: mgsc_1127/software/pwin: Is a directory
md5sum: mgsc_1127/software/sunos: Is a directory
md5sum: mgsc_1128/software/pwin: Is a directory
md5sum: mgsc_1128/software/sunos: Is a directory
```

```
[jwang@starburst checksum]$ md5sum */**/* >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level4_orig.out
```

```
[jwang@starburst checksum]$ md5sum */**/**/* >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level5_orig.out
md5sum: No match.
```

```
[jwang@starburst checksum]$ ls -al /rdata/jwang/MPGA/checksum/dmgsc_1001/
total 268
drwxr-xr-x  2 jwang  users    4096 Jan 29 13:19 .
drwxr-xr-x  4 jwang  users    4096 Jan 19 14:27 ..
-rw-r--r--  1 jwang  users      93 Jan 29 11:36 checksum_level1_orig.out
-rw-r--r--  1 jwang  users   1176 Jan 29 12:54 checksum_level2_orig.out
-rw-r--r--  1 jwang  users 248087 Jan 29 13:10 checksum_level3_orig.out
-rw-r--r--  1 jwang  users   2982 Jan 29 13:13 checksum_level4_orig.out
-rw-r--r--  1 jwang  users      0 Jan 29 13:19 checksum_level5_orig.out
```

### **Modified scripts to allow elapse time tracking for this test, and to direct output files to dedicated folders.**

**Note:** The script START-JOB--MPGA-package\_generator\_v6\_0alpha.com was modified to change the parameter definitions of “output” and “log” for the MPGA-launch command to direct the output files to a designated directory and be named based on the data volume so that the files will not be overwritten by new program execution. The MPGA-launch command was also modified to run in the foreground, instead of as a background process; therefore, the elapse time for executing this script can be calculated by running “time” command prior to invoking the script.

The configuration file stage\_in\_directory\_v6\_0.lst was modified to fill in values of output-package, PRIMARY COLLECTION ID, GROUPING\_RECOMMENDED\_NAME, BEGIN\_DATE\_TIME, VOLUME\_ID, VOLUME\_VERSION\_ID associated with the data volumes in this test.

The syntax of the configuration file is described by this email from Patrick McCaslin, dated 1/9/07, subject: “Re: NSSDC MPGA Status update (01/09)”:

*Sean,*

*Mark has completed some MPGA large file tests at both the NSSDC and JPL/PDS. As I mentioned in my last message, this is not an MPGA production version. This version can package PDS volumes into valid AIPs but volume level attributes have to be provided to the packaging software manually. Mark is working on the module that will obtain volume level attributes from the volume contents.*

The MPGA software is in '~hei/MPGA/run/'. For testing, Mark uses a soft link "dataset.dir" to identify the volume to package. There is also tab-delimited list file - "stage\_in\_directory\_v6\_0.lst" - containing the global level attributes and other processing instructions. The list file format is:

```
<process designator flag><tab><grouping description><tab><grouping
method><cr/lf>
<input-directory><tab><output
package><tab><PRIMARY_COLLECTION_ID><tab><GROUPING_RECOMMENDED_NAME><ta
b><
BEGIN_DATE_TIME><tab><END_DATE_TIME><tab><VOLUME_ID><tab><VOLUME_VERSIO
N_ID>
<cr/lf>
```

The current list file looks like this:

```
PDS_RUN Maintain directory structure / view  DIRECTORY_CONTENT

../run/dataset.dir/  ../stage_out/output_AIP0001.aip PSPG-00729
DMGSC_1047  <BEGIN_DATE_TIME>    n/a  <VOLUME_ID>
<VOLUME_VERSION_ID>
```

The production version listfile will have a simpler format.

To run, type: ./START-JOB--MPGA-package\_generator\_v6\_0alpha.com

The routine starts by moving into the "MPGA/sys/" directory, so set any files or directories in the input list file relative to "sys/"

If you wish, you can copy the software from Mark's directory into your own and run it. It would, I think, be useful to generate a couple of AIPs with this MPGA version and do an end-to-end test through NSSDC.

Pat

**Examined modified content of configuration file - stage\_in\_directory\_v6\_0.lst , and the packaging script START-JOB--MPGA-package\_generator\_v6\_0alpha.com.**

```
[jwang@starburst run]$ cd /rdata/jwang/MPGA/run
```

```
[jwang@starburst run]$ cat stage_in_directory_v6_0.lst
PDS_RUN Maintain directory structure / view  DIRECTORY_CONTENT
/data/dmgsc_1001  ../AIP_OUTPUT/dmgsc_1001/output_AIP_dmgsc_1001.aip PSPG-00730
DMGSC_1001  n/a  n/a  DMGSC_1001  VERSION 1
```

```
[jwang@starburst run]$ cat START-JOB--MPGA-package_generator_v6_0alpha.com
cd ../sys/
./MPGA-launch \
  -workdir=./MPGA_WORKING_DIR/\
  -setup=./PDS-packager.v6_0.in_development.2.setup \
```



```
-input=./run/stage_in_directory_v6_0.lst \  
-mlst_tspec=./TEMPLATE_SPEC/PDS-maplist.v6_0.in_development.2.tspec \  
-one_AIP_per_Row \  
-agen_tspec=./TEMPLATE_SPEC/PDS-aipgen.v6_0.in_development.2.tspec \  
-output=./AIP_OUTPUT/dmgsc_1001/out-MPGA-package_generator-msgs_dmgsc_1001.diag \  
-log=./AIP_OUTPUT/dmgsc_1001/out-MPGA-package_generator-msgs_dmgsc_1001.log  
cd ../run/
```

**Executed the program and captured the elapse time. The program was run from the “run” directory under the MPGA software tree. A status was shown at the end of the execution with statistics information gathered by the “time” command.**

```
[jwang@starburst run]$ cd /rdata/jwang/MPGA/run
```

```
[jwang@starburst run]$ time ./START-JOB--MPGA-package_generator_v6_0alpha.com  
SUCCESS
```

```
real 32m28.864s  
user 0m0.050s  
sys 0m0.030s  
0.050u 0.030s 32:28.87 0.0% 0+0k 0+0io 1382pf+0w
```

*Note:* To monitor the progress of AIP packaging during the execution, the “ps” command was run periodically from a different command window after the program started for approximately 2 minutes. The run time increased as the program execution progressed, which indicated that the AIP generator was functioning properly.

```
[jwang@starburst run]$ ps -x | grep MPGA-aip_generator|grep -v grep  
16149 ?    R    8:21 ./MPGA-aip_generator
```

```
[jwang@starburst run]$ ps -x | grep MPGA-aip_generator | grep -v grep  
16149 ?    R   10:28 ./MPGA-aip_generator
```

*Note:* Another method for verification was to monitor the size increase of the AIP file output from the program. The file was not generated until half way of the execution. Ran “ls -al” command to view the sizes.

```
[jwang@starburst dmgsc_1001]$ cd /rdata/jwang/MPGA/AIP_OUTPUT/dmgsc_1001
```

```
[jwang@starburst dmgsc_1001]$ ls -al output_AIP_dmgsc_1001.aip  
-rw-r--r--  1 jwang  users  543113216 Jan 29 13:08 output_AIP_dmgsc_1001.aip  
:  
:
```

```
[jwang@starburst dmgsc_1001]$ ls -al output_AIP_dmgsc_1001.aip  
-rw-r--r--  1 jwang  users  789340160 Jan 29 13:09 output_AIP_dmgsc_1001.aip
```

**Examined output and made a tar file. The tar file will be transferred to the remote NSSDC ftp server.**

*Note:* Three files were output from the execution of MPGA packager:

```
out-MPGA-package_generator-msgs_dmgsc_1001.diag 7.8 MBytes
out-MPGA-package_generator-msgs_dmgsc_1001.log 118 Bytes
output_AIP_dmgsc_1001.aip 3.9 GBytes
```

```
[jwang@starburst run]$ cd /rdata/jwang/MPGA/AIP_OUTPUT/dmgsc_1001/
```

```
[jwang@starburst dmgsc_1001]$ ls -al
total 3813048
drwxr-xr-x 2 jwang users 4096 Jan 29 2007 ./
drwxr-xr-x 5 jwang users 4096 Jan 29 14:30 ../
-rw-r--r-- 1 jwang users 7799 Jan 29 2007 out-MPGA-package_generator-
msgs_dmgsc_1001.diag
-rw-r--r-- 1 jwang users 118 Jan 29 2007 out-MPGA-package_generator-msgs_dmgsc_1001.log
-rw-rw-r-- 1 jwang users 3900724696 Jan 29 14:31 output_AIP_dmgsc_1001.aip
```

```
[jwang@starburst dmgsc_1001]$ cd ..
```

```
[jwang@starburst AIP_OUTPUT]$ pwd
/rdata/jwang/MPGA/AIP_OUTPUT
```

```
[jwang@starburst AIP_OUTPUT]$ tar cvf dmgsc_1001.tar dmgsc_1001
```

```
[jwang@starburst AIP_OUTPUT]$ ls -al dmgsc_1001.tar
-rw-r--r-- 1 jwang users 3900743680 Jan 29 15:38 dmgsc_1001.tar
```

### **FTPped the result tar file to NSSDC**

**Note:** An issue occurred when I attempted to ftp `dmgsc_1001.tar` to NSSDC. The ftp processes hanged during file transfer. The amount of data got transferred before each failure was inconsistent, and the ftp process eventually got timed out. However, both NSSDC and JPL were able to ftp large-size files (larger than 2GB) internally. The process finally went through successfully after the source of the ftp was moved from the NFS mounted drive `/rdata` to a directory on the internal drive `/home/jwang/nssdc_ftp_orig`.

**Note:** The elapse time statistics for ftp was not displayed. Therefore, a “date” command was run prior to the ftp. The completion time was obtained by examine the timestamp of the fully transferred file on the target location.

```
[jwang@starburst test_runlogs]$ date
Tue Feb 7 15:26:12 PST 2007
```

```
[jwang@starburst ~/nssdc_ftp_orig]$ ftp nssdcftp.gsfc.nasa.gov
Connected to windsor.gsfc.nasa.gov.
Name (nssdcftp.gsfc.nasa.gov:jwang): pds
331 Password required for pds.
Password:
230 User pds logged in.
ftp> send dmgsc_1001.tar
local: dmgsc_1001.tar remote: dmgsc_1001.tar
```

227 Entering Passive Mode (128,183,114,83,178,10).  
150 Opening BINARY mode data connection for dmgsc\_1001.tar  
226 Transfer complete.

**Note:** The ftp process started at 15:27 and completed at 18:26 PST, February 7, 2007, about 3.9GB data got transferred at an rate of approximately 360 Kbytes/Sec.

The progress of the ftp was examined by opening another ftp session and running "ls" command on the target location and observed the increasing size of the tar file.

```
ftp> ls dmgsc_1001.tar
227 Entering Passive Mode (128,183,114,83,178,175).
150 Opening ASCII mode data connection for file list
-rw-r--r-- 1 pds pds 516941504 Feb 7 23:47 dmgsc_1001.tar
226 Transfer complete.
:
:
ftp> ls dmgsc_1001.tar
227 Entering Passive Mode (128,183,114,83,178,189).
150 Opening ASCII mode data connection for file list
-rw-r--r-- 1 pds pds 584891552 Feb 7 23:50 dmgsc_1001.tar
226 Transfer complete.
```

**EN emailed NSSDC after the above file transfer was successful. NSSDC then performed deep archive procedures to store the file.**

**NSSDC then retrieved the archived files and posted onto the NSSDC ftp site to be available for testing of file download and unpacking.**

### **FTPped AIPs from NSSDC**

**Note:** By default, the splitter looks for AIPs inside MPGA/stage\_out directory, therefore the local directory was set to this location. The ftp process started 10:33 PST, March 18, 2007 and completed at 13:51 PST March 18, 2007, about 3.9GB data were transferred at a rate of 541 Kbytes/Sec.

```
[jwang@starburst stage_out]$ pwd
/rdata/jwang/MPGA/stage_out
```

```
[jwang@starburst stage_out]$ date
Sun Mar 18 10:33:35 PDT 2007
```

```
[jwang@starburst stage_out]$ ftp nssdcftp.gsfc.nasa.gov
```

```
ftp> get output_AIP_dmgsc_1001.aip
```

**Ran the splitter to extract the AIP. Because the splitter program unpacks AIPs in batch, the restoration of test volumes was performed after all AIPs were downloaded from NSSDC. Details of running the splitter is described at the section "Unpack AIPs with the Splitter".**

## **DMGSC 1018 Data Set Volume Test**

**Added a directory to hold MPGA generated outputs and checksum data for dmgsc\_1018.**

```
[jwang@starburst MPGA]$ cd /rdata/jwang/MPGA/AIP_OUTPUT
```

```
[jwang@starburst AIP_OUTPUT]$ mkdir dmgsc_1018
```

```
[jwang@starburst AIP_OUTPUT]$ cd /rdata/jwang/MPGA/checksum
```

```
[jwang@starburst checksum]$ mkdir dmgsc_1018
```

**Get the checksums of every file in the volume DMGSC 1018 and save the results.**

*Note:* The files under this volume had to be separated into two categories of files mgsc\_123\* and mgsc\_124\* from the 2<sup>nd</sup> level of checksum process, due to the number of file exceeded system limit and caused an “Argument list too long” error

```
[jwang@starburst dmgsc_1001]$ cd /data/dmgsc_1018
```

```
[jwang@starburst dmgsc_1018]$ md5sum * >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level1_orig.out
md5sum: mgsc_1235: Is a directory
md5sum: mgsc_1236: Is a directory
md5sum: mgsc_1237: Is a directory
md5sum: mgsc_1238: Is a directory
md5sum: mgsc_1239: Is a directory
md5sum: mgsc_1240: Is a directory
md5sum: mgsc_1241: Is a directory
md5sum: mgsc_1242: Is a directory
md5sum: mgsc_1243: Is a directory
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_123*/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level2_mgsc_123_orig.out
md5sum: mgsc_1235/catalog: Is a directory
md5sum: mgsc_1235/document: Is a directory
md5sum: mgsc_1235/e19000: Is a directory
md5sum: mgsc_1235/e19001: Is a directory
md5sum: mgsc_1235/e19002: Is a directory
md5sum: mgsc_1235/e19003: Is a directory
md5sum: mgsc_1235/e19004: Is a directory
md5sum: mgsc_1235/e19005: Is a directory
md5sum: mgsc_1235/e19006: Is a directory
md5sum: mgsc_1235/e19007: Is a directory
md5sum: mgsc_1235/index: Is a directory
md5sum: mgsc_1235/software: Is a directory
md5sum: mgsc_1236/catalog: Is a directory
```

md5sum: mgsc\_1236/document: Is a directory  
md5sum: mgsc\_1236/e20000: Is a directory  
md5sum: mgsc\_1236/e20001: Is a directory  
md5sum: mgsc\_1236/e20002: Is a directory  
md5sum: mgsc\_1236/e20003: Is a directory  
md5sum: mgsc\_1236/e20004: Is a directory  
md5sum: mgsc\_1236/e20005: Is a directory  
md5sum: mgsc\_1236/e20006: Is a directory  
md5sum: mgsc\_1236/e20007: Is a directory  
md5sum: mgsc\_1236/e20008: Is a directory  
md5sum: mgsc\_1236/e20009: Is a directory  
md5sum: mgsc\_1236/e20010: Is a directory  
md5sum: mgsc\_1236/e20011: Is a directory  
md5sum: mgsc\_1236/e20012: Is a directory  
md5sum: mgsc\_1236/e20013: Is a directory  
md5sum: mgsc\_1236/index: Is a directory  
md5sum: mgsc\_1236/software: Is a directory  
md5sum: mgsc\_1237/catalog: Is a directory  
md5sum: mgsc\_1237/document: Is a directory  
md5sum: mgsc\_1237/e20013: Is a directory  
md5sum: mgsc\_1237/e20014: Is a directory  
md5sum: mgsc\_1237/e20015: Is a directory  
md5sum: mgsc\_1237/e20016: Is a directory  
md5sum: mgsc\_1237/e20017: Is a directory  
md5sum: mgsc\_1237/index: Is a directory  
md5sum: mgsc\_1237/software: Is a directory  
md5sum: mgsc\_1238/catalog: Is a directory  
md5sum: mgsc\_1238/document: Is a directory  
md5sum: mgsc\_1238/e21000: Is a directory  
md5sum: mgsc\_1238/e21001: Is a directory  
md5sum: mgsc\_1238/e21002: Is a directory  
md5sum: mgsc\_1238/e21003: Is a directory  
md5sum: mgsc\_1238/e21004: Is a directory  
md5sum: mgsc\_1238/e21005: Is a directory  
md5sum: mgsc\_1238/e21006: Is a directory  
md5sum: mgsc\_1238/e21007: Is a directory  
md5sum: mgsc\_1238/e21008: Is a directory  
md5sum: mgsc\_1238/e21009: Is a directory  
md5sum: mgsc\_1238/e21010: Is a directory  
md5sum: mgsc\_1238/e21011: Is a directory  
md5sum: mgsc\_1238/e21012: Is a directory  
md5sum: mgsc\_1238/index: Is a directory  
md5sum: mgsc\_1238/software: Is a directory  
md5sum: mgsc\_1239/catalog: Is a directory  
md5sum: mgsc\_1239/document: Is a directory  
md5sum: mgsc\_1239/e21013: Is a directory  
md5sum: mgsc\_1239/e21014: Is a directory  
md5sum: mgsc\_1239/e21015: Is a directory  
md5sum: mgsc\_1239/e21016: Is a directory  
md5sum: mgsc\_1239/e21017: Is a directory

md5sum: mgsc\_1239/index: Is a directory  
md5sum: mgsc\_1239/software: Is a directory

[jwang@starburst dmgsc\_1018]\$ md5sum mgsc\_124\*/\* >  
/rdata/jwang/MPGA/checksum/dmgsc\_1018/checksum\_level2\_mgsc\_124\_orig.out

md5sum: mgsc\_1240/catalog: Is a directory  
md5sum: mgsc\_1240/document: Is a directory  
md5sum: mgsc\_1240/e22000: Is a directory  
md5sum: mgsc\_1240/e22001: Is a directory  
md5sum: mgsc\_1240/e22002: Is a directory  
md5sum: mgsc\_1240/e22003: Is a directory  
md5sum: mgsc\_1240/e22004: Is a directory  
md5sum: mgsc\_1240/e22005: Is a directory  
md5sum: mgsc\_1240/e22006: Is a directory  
md5sum: mgsc\_1240/e22007: Is a directory  
md5sum: mgsc\_1240/e22008: Is a directory  
md5sum: mgsc\_1240/e22009: Is a directory  
md5sum: mgsc\_1240/e22010: Is a directory  
md5sum: mgsc\_1240/e22011: Is a directory  
md5sum: mgsc\_1240/e22012: Is a directory  
md5sum: mgsc\_1240/index: Is a directory  
md5sum: mgsc\_1240/software: Is a directory  
md5sum: mgsc\_1241/catalog: Is a directory  
md5sum: mgsc\_1241/document: Is a directory  
md5sum: mgsc\_1241/e22012: Is a directory  
md5sum: mgsc\_1241/e22013: Is a directory  
md5sum: mgsc\_1241/e22014: Is a directory  
md5sum: mgsc\_1241/e22015: Is a directory  
md5sum: mgsc\_1241/e22016: Is a directory  
md5sum: mgsc\_1241/index: Is a directory  
md5sum: mgsc\_1241/software: Is a directory  
md5sum: mgsc\_1242/catalog: Is a directory  
md5sum: mgsc\_1242/document: Is a directory  
md5sum: mgsc\_1242/e23000: Is a directory  
md5sum: mgsc\_1242/e23001: Is a directory  
md5sum: mgsc\_1242/e23002: Is a directory  
md5sum: mgsc\_1242/e23003: Is a directory  
md5sum: mgsc\_1242/e23004: Is a directory  
md5sum: mgsc\_1242/e23005: Is a directory  
md5sum: mgsc\_1242/e23006: Is a directory  
md5sum: mgsc\_1242/e23007: Is a directory  
md5sum: mgsc\_1242/e23008: Is a directory  
md5sum: mgsc\_1242/e23009: Is a directory  
md5sum: mgsc\_1242/e23010: Is a directory  
md5sum: mgsc\_1242/e23011: Is a directory  
md5sum: mgsc\_1242/e23012: Is a directory  
md5sum: mgsc\_1242/e23013: Is a directory  
md5sum: mgsc\_1242/e23014: Is a directory  
md5sum: mgsc\_1242/index: Is a directory  
md5sum: mgsc\_1242/software: Is a directory

```
md5sum: mgsc_1243/catalog: Is a directory
md5sum: mgsc_1243/document: Is a directory
md5sum: mgsc_1243/index: Is a directory
md5sum: mgsc_1243/r01000: Is a directory
md5sum: mgsc_1243/r01001: Is a directory
md5sum: mgsc_1243/r01002: Is a directory
md5sum: mgsc_1243/r01003: Is a directory
md5sum: mgsc_1243/r01004: Is a directory
md5sum: mgsc_1243/r01005: Is a directory
md5sum: mgsc_1243/r01006: Is a directory
md5sum: mgsc_1243/r01007: Is a directory
md5sum: mgsc_1243/r01008: Is a directory
md5sum: mgsc_1243/r01009: Is a directory
md5sum: mgsc_1243/software: Is a directory
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_123*/**/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc_123_orig.out
md5sum: mgsc_1235/software/pcwin: Is a directory
md5sum: mgsc_1235/software/sunos: Is a directory
md5sum: mgsc_1236/software/pcwin: Is a directory
md5sum: mgsc_1236/software/sunos: Is a directory
md5sum: mgsc_1237/software/pcwin: Is a directory
md5sum: mgsc_1237/software/sunos: Is a directory
md5sum: mgsc_1238/software/pcwin: Is a directory
md5sum: mgsc_1238/software/sunos: Is a directory
md5sum: mgsc_1239/software/pcwin: Is a directory
md5sum: mgsc_1239/software/sunos: Is a directory
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_124*/**/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc_124_orig.out
md5sum: mgsc_1240/software/pcwin: Is a directory
md5sum: mgsc_1240/software/sunos: Is a directory
md5sum: mgsc_1241/software/pcwin: Is a directory
md5sum: mgsc_1241/software/sunos: Is a directory
md5sum: mgsc_1242/software/pcwin: Is a directory
md5sum: mgsc_1242/software/sunos: Is a directory
md5sum: mgsc_1243/software/pcwin: Is a directory
md5sum: mgsc_1243/software/sunos: Is a directory
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_123*/**/*/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc_123_orig.out
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_124*/**/*/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc_124_orig.out
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_123*/**/*/*/* >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc_123_orig.out
md5sum: No match.
```

```
[jwang@starburst dmgsc_1018]$ md5sum mgsc_124**/**/** >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc_124_orig.out
md5sum: No match.
```

```
[jwang@starburst dmgsc_1018]$ ls -al /rdata/jwang/MPGA/checksum/dmgsc_1018/
total 560
drwxr-xr-x  2 jwang  users   4096 Jan 29 16:40 .
drwxr-xr-x  4 jwang  users   4096 Jan 19 14:27 ..
-rw-r--r--  1 jwang  users    93 Jan 29 16:01 checksum_level1_orig.out
-rw-r--r--  1 jwang  users   840 Jan 29 16:03 checksum_level2_mgsc_123_orig.out
-rw-r--r--  1 jwang  users   672 Jan 29 16:03 checksum_level2_mgsc_124_orig.out
-rw-r--r--  1 jwang  users 267253 Jan 29 16:09 checksum_level3_mgsc_123_orig.out
-rw-r--r--  1 jwang  users 265988 Jan 29 16:37 checksum_level3_mgsc_124_orig.out
-rw-r--r--  1 jwang  users  2130 Jan 29 16:39 checksum_level4_mgsc_123_orig.out
-rw-r--r--  1 jwang  users  1704 Jan 29 16:40 checksum_level4_mgsc_124_orig.out
-rw-r--r--  1 jwang  users    0 Jan 29 16:40 checksum_level5_mgsc_123_orig.out
-rw-r--r--  1 jwang  users    0 Jan 29 16:40 checksum_level5_mgsc_124_orig.out
```

### **Modified scripts to allow elapse time tracking for this test, and to direct output files to dedicated folders.**

**Note:** The script START-JOB--MPGA-package\_generator\_v6\_0alpha.com was modified to change the parameter definitions of “output” and “log” for the MPGA-launch command to direct the output files to a designated directory and be named based on the data volume so that the files will not be overwritten by new program execution. The MPGA-launch command was also modified to run in the foreground, instead of as a background process; therefore, the elapse time for executing this script can be calculated by running “time” command prior to invoking the script.

The configuration file stage\_in\_directory\_v6\_0.lst was modified to fill in values of output-package, PRIMARY COLLECTION ID, GROUPING\_RECOMMENDED\_NAME, BEGIN\_DATE\_TIME, VOLUME\_ID, VOLUME\_VERSION\_ID associated with the data volumes in this test.

### **Examined modified content of configuration file - stage\_in\_directory\_v6\_0.lst , and the packaging script START-JOB--MPGA-package\_generator\_v6\_0alpha.com.**

```
[jwang@starburst run]$ cd /rdata/jwang/MPGA/run
```

```
[jwang@starburst run]$ cat stage_in_directory_v6_0.lst
PDS_RUN Maintain directory structure / view   DIRECTORY_CONTENT
/data/dmgsc_1018  ../AIP_OUTPUT/dmgsc_1018/output_AIP_dmgsc_1018.aip   PSPG-00730
DMGSC_1018      n/a   n/a   DMGSC_1018   VERSION 1
```

```
[jwang@starburst run]$ cat START-JOB--MPGA-package_generator_v6_0alpha.com
cd ../sys/
./MPGA-launch \
  -workdir=./MPGA_WORKING_DIR/\
  -setup=./PDS-packager.v6_0.in_development.2.setup \
  -input=./run/stage_in_directory_v6_0.lst \
```



```
-mlst_tspec=./TEMPLATE_SPEC/PDS-maplist.v6_0.in_development.2.tspec \  
-one_AIP_per_Row \  
-agen_tspec=./TEMPLATE_SPEC/PDS-aipgen.v6_0.in_development.2.tspec \  
-output=./AIP_OUTPUT/dmgsc_1018/out-MPGA-package_generator-msgs_dmgsc_1018.diag \  
-log=./AIP_OUTPUT/dmgsc_1018/out-MPGA-package_generator-msgs_dmgsc_1018.log  
cd ../run/
```

**Executed the program and captured the elapse time. A status was shown at the end of the execution with statistics information gathered by the “time” command.**

```
[jwang@starburst run]$ time ./START-JOB--MPGA-package_generator_v6_0alpha.com  
SUCCESS  
0.310u 0.090s 39:26.83 0.0% 0+0k 0+0io 1380pf+0w
```

*Note:* To monitor the progress of AIP packaging during the execution, the “ps” command was run periodically from a different command window after the program started for approximately 2 minutes. The run time increased as the program execution progressed, which indicated that the AIP generator was functioning properly.

```
[jwang@starburst dmgsc_1018]$ ps -x | grep MPGA-aip_generator | grep -v grep  
10232 ?    R   21:55 ./MPGA-aip_generator  
:  
:  
[jwang@starburst dmgsc_1018]$ ps -x | grep MPGA-aip_generator | grep -v grep  
10232 ?    R   22:44 ./MPGA-aip_generator
```

*Note:* Another method for verification was to monitor the size increase of the AIP file output from the program. The file was not generated until half way of the execution. Ran “ls -al” command to view the sizes.

```
[jwang@starburst dmgsc_1018]$ cd /rdata/jwang/MPGA/AIP_OUTPUT/dmgsc_1018  
[jwang@starburst dmgsc_1018]$ ls -al output_AIP_dmgsc_1018.aip  
-rw-r--r-- 1 jwang  users 3294482432 Feb 07 14:44 output_AIP_dmgsc_1018.aip  
:  
:  
[jwang@starburst dmgsc_1018]$ ls -al output_AIP_dmgsc_1018.aip  
-rw-r--r-- 1 jwang  users 3605004288 Feb 07 14:46 output_AIP_dmgsc_1018.aip
```

**Examined output and made a tar file. The tar file will be transferred to the remote NSSDC ftp server.**

*Note:* Three files were output from the execution of MPGA packager:

out-MPGA-package_generator-msgs_dmgsc_1018.diag	8.9 MBytes
out-MPGA-package_generator-msgs_dmgsc_1018.log	118 Bytes
output_AIP_dmgsc_1018.aip	4.2 GBytes

```
[jwang@starburst MPGA]$ cd /rdata/jwang/MPGA/AIP_OUTPUT/dmgsc_1018
```

```
[jwang@starburst dmgsc_1018]$ ls -al
```

```
total 4149836
drwxr-xr-x  2 jwang  users    4096 Jan 29 17:07 .
drwxr-xr-x  7 jwang  users    4096 Feb  6 11:38 ..
-rw-r--r--  1 jwang  users    8995 Jan 29 17:27 out-MPGA-package_generator-
msgs_dmgsc_1018.diag
-rw-r--r--  1 jwang  users     118 Jan 29 17:27 out-MPGA-package_generator-msgs_dmgsc_1018.log
-rw-rw-r--  1 jwang  users 4245253731 Jan 29 17:27 output_AIP_dmgsc_1018.aip
```

```
[jwang@starburst dmgsc_1018]$ cd ..
```

```
[jwang@starburst AIP_OUTPUT]$ pwd
```

```
/rdata/jwang/MPGA/AIP_OUTPUT
```

```
[jwang@starburst AIP_OUTPUT]$ tar cvf dmgsc_1018.tar dmgsc_1018
```

### **FTPped the result tar file to NSSDC**

**Note:** The ftp timed out issue occurred again, even when the ftp source was put on a location at the local drive of the source system. To solve this, the tar file was copied over to another machine (pdsdlb3), and the ftp went through successfully.

**Note:** The elapse time statistics for ftp was not displayed. Therefore, a “date” command was run prior to the ftp. The completion time was obtained by examine the timestamp of the fully transferred file on the target location.

```
[jwang@starburst AIP_OUTPUT]$ cd /rdata/jwang/MPGA/AIP_OUTPUT
```

```
[jwang@starburst AIP_OUTPUT]$ scp dmgsc_1018 jwang@pdsdlb3:/home/jwang/nssdc_test
```

On pdsdlb3:

```
[jwang@pdsdlb3 nssdc_test]$ date
```

```
Thu Feb  8 15:47:31 PST 2007
```

```
[jwang@pdsdlb3 nssdc_test]$ ftp nssdcftp.gsfc.nasa.gov
```

```
Connected to windsor.gsfc.nasa.gov.
```

```
Name (nssdcftp.gsfc.nasa.gov:jwang): pds
```

```
331 Password required for pds.
```

```
Password:
```

```
230 User pds logged in.
```

```
ftp> send dmgsc_1018.tar
```

```
local: dmgsc_1018.tar remote: dmgsc_1018.tar
```

```
227 Entering Passive Mode (128,183,114,83,231,56).
```

```
150 Opening BINARY mode data connection for dmgsc_1018.tar
```

```
226 Transfer complete.
```

**Note:** The ftp started 15:47 and completed at 18:46 PST, February 8, 2007, about 4.25GB data got transferred at an rate of approximately 590 KBytes/Sec.

The progress of the ftp was examined by opening another ftp session and running "ls" command on the target location. The size of the tar file continues to increase

```
ftp> ls dmgsc_1018.tar
227 Entering Passive Mode (128,183,114,83,224,87).
150 Opening ASCII mode data connection for file list
-rw-r--r-- 1 pds  pds  154571104 Feb  8 21:50 dmgsc_1018.tar
226 Transfer complete.
:
:
ftp> ls dmgsc_1018.tar
227 Entering Passive Mode (128,183,114,83,225,89).
150 Opening ASCII mode data connection for file list
-rw-r--r-- 1 pds  pds  734883632 Feb  8 22:17 dmgsc_1018.tar
```

**EN emailed NSSDC after the above file transfer was successful. NSSDC then performed deep archive procedures to store the file.**

**NSSDC then retrieved the archived files and posted onto the NSSDC ftp site to be available for testing of file download and unpacking.**

### **FTPped AIPs from NSSDC**

*Note:* By default, the splitter looks for AIPs inside MPGA/stage\_out directory, therefore the local directory was set to this location. The ftp process started 10:37 PST, March 18, 2007 and completed at 14:12 PST March 18, 2007, about 4.25GB data were transferred at a rate of 329 Kbytes/Sec.

```
[jwang@starburst stage_out]$ pwd
/rdata/jwang/MPGA/stage_out
```

```
[jwang@starburst stage_out]$ date
Sun Mar 18 10:37:48 PDT 2007
```

```
[jwang@starburst stage_out]$ ftp nssdcftp.gsfc.nasa.gov
```

```
ftp> get output_AIP_dmgsc_1018.aip
```

**Ran the splitter to extract the AIP. Because the splitter program unpacks AIPs in batch, the restoration of test volumes was performed after all AIPs were downloaded from NSSDC. Details of running the splitter is described at the section "Unpack AIPs with the Splitter".**

### ***Unpack AIPs with the Splitter***

**Execute the splitter utility**

**Note:** The splitter utility, located at MPGA/run, runs against all AIPs at one specific location (defined as – aip\_wildcard in the run script START-JOB--MPGA-reconstitute\_packages\_v6\_0alpha.com) and unpacks them all in a batch. The unpacked volumes are given randomly generated names. Attribute files are generated with details information for each volume, which provides a way to associate volume ids with the extracted volumes. It took 1 hour and 2 minutes to extract the two AIPs generated in the test and reconstruct them back to two volumes.

```
[jwang@starburst stage_out]$ pwd
/rdata/jwang/MPGA/stage_out
```

```
[jwang@starburst stage_out]$ ls -al
total 7962412
drwxr-xr-x  2 jwang  users    4096 Mar 18 10:40 ./
drwxr-xr-x 12 jwang  users    4096 Mar 18 16:22 ../
-rw-r--r--  1 jwang  users  3900582505 Mar 18 13:51 output_AIP_dmgsc_1001.aip
-rw-r--r--  1 jwang  users  4244950398 Mar 18 14:12 output_AIP_dmgsc_1018.aip
```

```
[jwang@starburst run]$ cd /rdata/jwang/MPGA/run
```

```
[jwang@starburst run]$ cat START-JOB--MPGA-reconstitute_packages_v6_0alpha.com
cd ../sys/
./MPGA-launch \
    -workdir=./MPGA_WORKING_DIR/\
    -setup=./verify-splitterlist.setup \
    -aip_wildcard=./stage_out/*aip
cd ../run/
```

```
[jwang@starburst run]$ time ./START-JOB--MPGA-reconstitute_packages_v6_0alpha.com
* SplLst NOTE: Started Module "local:./MPGA-splitterlist"* SplLst NOTE: Processed 2 AIP(s) in 0
sec* VERBOSE: init registry, SRVR: dbase file=./MPGA_WORKING_DIR/srv_dbaseobj_XXXXXX"
* Splitter Started and Initialized:
```

Accessing AIPs...

```
TEST0000000036 0 SPL PASS: "../stage_out/output_AIP_dmgsc_1001.aip" into
"../stage_out/TEST0000000036.dat" and "../stage_out/TEST0000000036.att"
TEST0000000037 0 SPL PASS: "../stage_out/output_AIP_dmgsc_1018.aip" into
"../stage_out/TEST0000000037.dat" and "../stage_out/TEST0000000037.att"
* SPL NOTE: module "local:./MPGA-splitter" completely processed 2 out of 2 AIPs in 3764 (secs)
SUCCESS
0.010u 0.010s 1:02:45.86 0.0% 0+0k 0+0io 1389pf+0w
```

```
[jwang@starburst stage_out]$ cd /rdata/jwang/MPGA/stage_out
```

```
[jwang@starburst stage_out]$ ls -al
total 7981872
drwxr-xr-x  4 jwang  users    4096 Mar 19 11:15 .
drwxr-xr-x  9 jwang  users    4096 Mar 19 12:18 ..
-rw-r--r--  1 jwang  users  3900582505 Mar 18 13:51 output_AIP_dmgsc_1001.aip
-rw-r--r--  1 jwang  users  4244950398 Mar 18 14:12 output_AIP_dmgsc_1018.aip
-rw-r--r--  1 jwang  users   6346251 Mar 19 10:40 TEST0000000036.att
```

```
drwxr-xr-x  9 jwang  users    4096 Mar 19 11:10 TEST0000000036.dat.dir
-rw-r--r--  1 jwang  users   13535757 Mar 19 11:13 TEST0000000037.att
drwxr-xr-x 11 jwang  users    4096 Mar 19 11:57 TEST0000000037.dat.dir
```

**By searching “VOLUME\_ID” string inside attribute files (.att), a mapping of volume name and unpacked volume names is shown.**

*Note:* The following command indicates TEST0000000036 is temporary volume name of dmgsc\_1001 and TEST0000000037 is for dmgsc\_1018. Therefore, the actual unpacked data contents for volumes dmgsc\_1001 and dmgsc\_1018 are inside TEST0000000036.dat.dir and TEST0000000037.dat.dir accordingly.

```
[jwang@starburst stage_out]$ grep VOLUME_ID *.att
TEST0000000036.att:  VOLUME_ID = "DMGSC_1001";
TEST0000000037.att:  VOLUME_ID = "DMGSC_1018";
```

**Run checksum on unpacked volumes and redirect results to files.**

*Note:* The result files from the above checksum were stored under different names to the original ones.

```
[jwang@starburst stage_out]$ cd /rdata/jwang/MPGA/stage_out
```

```
[jwang@starburst stage_out]$ cd TEST0000000036.dat.dir
```

```
[jwang@starburst TEST0000000036.dat.dir]$ md5sum * >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level1_new.out
md5sum: mgsc_1122: Is a directory
md5sum: mgsc_1123: Is a directory
md5sum: mgsc_1124: Is a directory
md5sum: mgsc_1125: Is a directory
md5sum: mgsc_1126: Is a directory
md5sum: mgsc_1127: Is a directory
md5sum: mgsc_1128: Is a directory
```

```
[jwang@starburst TEST0000000036.dat.dir]$ md5sum ** >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level2_new.out
md5sum: mgsc_1122/catalog: Is a directory
md5sum: mgsc_1122/document: Is a directory
md5sum: mgsc_1122/e01000: Is a directory
md5sum: mgsc_1122/e01001: Is a directory
md5sum: mgsc_1122/e01002: Is a directory
md5sum: mgsc_1122/e01003: Is a directory
md5sum: mgsc_1122/e01004: Is a directory
md5sum: mgsc_1122/e01005: Is a directory
md5sum: mgsc_1122/e01006: Is a directory
md5sum: mgsc_1122/e01007: Is a directory
md5sum: mgsc_1122/e01008: Is a directory
md5sum: mgsc_1122/e01009: Is a directory
md5sum: mgsc_1122/index: Is a directory
md5sum: mgsc_1122/software: Is a directory
```

md5sum: mgsc\_1123/catalog: Is a directory  
md5sum: mgsc\_1123/document: Is a directory  
md5sum: mgsc\_1123/e01010: Is a directory  
md5sum: mgsc\_1123/e01011: Is a directory  
md5sum: mgsc\_1123/e01012: Is a directory  
md5sum: mgsc\_1123/e01013: Is a directory  
md5sum: mgsc\_1123/e01014: Is a directory  
md5sum: mgsc\_1123/index: Is a directory  
md5sum: mgsc\_1123/software: Is a directory  
md5sum: mgsc\_1124/catalog: Is a directory  
md5sum: mgsc\_1124/document: Is a directory  
md5sum: mgsc\_1124/e01015: Is a directory  
md5sum: mgsc\_1124/e01016: Is a directory  
md5sum: mgsc\_1124/e01017: Is a directory  
md5sum: mgsc\_1124/e01018: Is a directory  
md5sum: mgsc\_1124/e01019: Is a directory  
md5sum: mgsc\_1124/index: Is a directory  
md5sum: mgsc\_1124/software: Is a directory  
md5sum: mgsc\_1125/catalog: Is a directory  
md5sum: mgsc\_1125/document: Is a directory  
md5sum: mgsc\_1125/e01019: Is a directory  
md5sum: mgsc\_1125/e01020: Is a directory  
md5sum: mgsc\_1125/e01021: Is a directory  
md5sum: mgsc\_1125/e01022: Is a directory  
md5sum: mgsc\_1125/index: Is a directory  
md5sum: mgsc\_1125/software: Is a directory  
md5sum: mgsc\_1126/catalog: Is a directory  
md5sum: mgsc\_1126/document: Is a directory  
md5sum: mgsc\_1126/e02000: Is a directory  
md5sum: mgsc\_1126/e02001: Is a directory  
md5sum: mgsc\_1126/e02002: Is a directory  
md5sum: mgsc\_1126/e02003: Is a directory  
md5sum: mgsc\_1126/e02004: Is a directory  
md5sum: mgsc\_1126/e02005: Is a directory  
md5sum: mgsc\_1126/index: Is a directory  
md5sum: mgsc\_1126/software: Is a directory  
md5sum: mgsc\_1127/catalog: Is a directory  
md5sum: mgsc\_1127/document: Is a directory  
md5sum: mgsc\_1127/e02006: Is a directory  
md5sum: mgsc\_1127/e02007: Is a directory  
md5sum: mgsc\_1127/e02008: Is a directory  
md5sum: mgsc\_1127/e02009: Is a directory  
md5sum: mgsc\_1127/e02010: Is a directory  
md5sum: mgsc\_1127/index: Is a directory  
md5sum: mgsc\_1127/software: Is a directory  
md5sum: mgsc\_1128/catalog: Is a directory  
md5sum: mgsc\_1128/document: Is a directory  
md5sum: mgsc\_1128/e02011: Is a directory  
md5sum: mgsc\_1128/e02012: Is a directory  
md5sum: mgsc\_1128/e02013: Is a directory

```
md5sum: mgsc_1128/e02014: Is a directory
md5sum: mgsc_1128/e02015: Is a directory
md5sum: mgsc_1128/index: Is a directory
md5sum: mgsc_1128/software: Is a directory
```

```
[jwang@starburst TEST0000000036.dat.dir]$ md5sum */**/* >
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level3_new.out
md5sum: mgsc_1122/software/pcwin: Is a directory
md5sum: mgsc_1122/software/sunos: Is a directory
md5sum: mgsc_1123/software/pcwin: Is a directory
md5sum: mgsc_1123/software/sunos: Is a directory
md5sum: mgsc_1124/software/pcwin: Is a directory
md5sum: mgsc_1124/software/sunos: Is a directory
md5sum: mgsc_1125/software/pcwin: Is a directory
md5sum: mgsc_1125/software/sunos: Is a directory
md5sum: mgsc_1126/software/pcwin: Is a directory
md5sum: mgsc_1126/software/sunos: Is a directory
md5sum: mgsc_1127/software/pcwin: Is a directory
md5sum: mgsc_1127/software/sunos: Is a directory
md5sum: mgsc_1128/software/pcwin: Is a directory
md5sum: mgsc_1128/software/sunos: Is a directory
[jwang@starburst TEST0000000036.dat.dir]$ md5sum */**/*/* >
/rdata/jwang/MPGA/cheecksum/dmgsc_1001/checksum_level4_new.out
```

```
[jwang@starburst TEST0000000036.dat.dir]$ md5sum */**/*/*/* >
/rdata/jwang/MPGA/chchecksum/dmgsc_1001/checksum_level5_new.out
md5sum: No match.
```

```
[jwang@starburst TEST0000000036.dat.dir]$ cd ../TEST0000000037.dat.dir
```

```
[jwang@starburst TEST0000000037.dat.dir]$ pwd
/rdata/jwang/MPGA/stage_out/TEST0000000037.dat.dir
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum * >
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level1_new.out
md5sum: mgsc_1235: Is a directory
md5sum: mgsc_1236: Is a directory
md5sum: mgsc_1237: Is a directory
md5sum: mgsc_1238: Is a directory
md5sum: mgsc_1239: Is a directory
md5sum: mgsc_1240: Is a directory
md5sum: mgsc_1241: Is a directory
md5sum: mgsc_1242: Is a directory
md5sum: mgsc_1243: Is a directory
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_123**/* >
/rdata/jwang/MPGA//checksum/dmgsc_1018/checksum_level2_mgsc123_new.out
md5sum: mgsc_1235/catalog: Is a directory
md5sum: mgsc_1235/document: Is a directory
md5sum: mgsc_1235/e19000: Is a directory
```

md5sum: mgsc\_1235/e19001: Is a directory  
md5sum: mgsc\_1235/e19002: Is a directory  
md5sum: mgsc\_1235/e19003: Is a directory  
md5sum: mgsc\_1235/e19004: Is a directory  
md5sum: mgsc\_1235/e19005: Is a directory  
md5sum: mgsc\_1235/e19006: Is a directory  
md5sum: mgsc\_1235/e19007: Is a directory  
md5sum: mgsc\_1235/index: Is a directory  
md5sum: mgsc\_1235/software: Is a directory  
md5sum: mgsc\_1236/catalog: Is a directory  
md5sum: mgsc\_1236/document: Is a directory  
md5sum: mgsc\_1236/e20000: Is a directory  
md5sum: mgsc\_1236/e20001: Is a directory  
md5sum: mgsc\_1236/e20002: Is a directory  
md5sum: mgsc\_1236/e20003: Is a directory  
md5sum: mgsc\_1236/e20004: Is a directory  
md5sum: mgsc\_1236/e20005: Is a directory  
md5sum: mgsc\_1236/e20006: Is a directory  
md5sum: mgsc\_1236/e20007: Is a directory  
md5sum: mgsc\_1236/e20008: Is a directory  
md5sum: mgsc\_1236/e20009: Is a directory  
md5sum: mgsc\_1236/e20010: Is a directory  
md5sum: mgsc\_1236/e20011: Is a directory  
md5sum: mgsc\_1236/e20012: Is a directory  
md5sum: mgsc\_1236/e20013: Is a directory  
md5sum: mgsc\_1236/index: Is a directory  
md5sum: mgsc\_1236/software: Is a directory  
md5sum: mgsc\_1237/catalog: Is a directory  
md5sum: mgsc\_1237/document: Is a directory  
md5sum: mgsc\_1237/e20013: Is a directory  
md5sum: mgsc\_1237/e20014: Is a directory  
md5sum: mgsc\_1237/e20015: Is a directory  
md5sum: mgsc\_1237/e20016: Is a directory  
md5sum: mgsc\_1237/e20017: Is a directory  
md5sum: mgsc\_1237/index: Is a directory  
md5sum: mgsc\_1237/software: Is a directory  
md5sum: mgsc\_1238/catalog: Is a directory  
md5sum: mgsc\_1238/document: Is a directory  
md5sum: mgsc\_1238/e21000: Is a directory  
md5sum: mgsc\_1238/e21001: Is a directory  
md5sum: mgsc\_1238/e21002: Is a directory  
md5sum: mgsc\_1238/e21003: Is a directory  
md5sum: mgsc\_1238/e21004: Is a directory  
md5sum: mgsc\_1238/e21005: Is a directory  
md5sum: mgsc\_1238/e21006: Is a directory  
md5sum: mgsc\_1238/e21007: Is a directory  
md5sum: mgsc\_1238/e21008: Is a directory  
md5sum: mgsc\_1238/e21009: Is a directory  
md5sum: mgsc\_1238/e21010: Is a directory  
md5sum: mgsc\_1238/e21011: Is a directory



md5sum: mgsc\_1238/e21012: Is a directory  
md5sum: mgsc\_1238/index: Is a directory  
md5sum: mgsc\_1238/software: Is a directory  
md5sum: mgsc\_1239/catalog: Is a directory  
md5sum: mgsc\_1239/document: Is a directory  
md5sum: mgsc\_1239/e21013: Is a directory  
md5sum: mgsc\_1239/e21014: Is a directory  
md5sum: mgsc\_1239/e21015: Is a directory  
md5sum: mgsc\_1239/e21016: Is a directory  
md5sum: mgsc\_1239/e21017: Is a directory  
md5sum: mgsc\_1239/index: Is a directory  
md5sum: mgsc\_1239/software: Is a directory

[jwang@starburst TEST0000000037.dat.dir]\$ md5sum mgsc\_124\*/\* >  
/rdata/jwang/MPGA//checksum/dmgsc\_1018/checksum\_level2\_mgsc124\_new.out

md5sum: mgsc\_1240/catalog: Is a directory  
md5sum: mgsc\_1240/document: Is a directory  
md5sum: mgsc\_1240/e22000: Is a directory  
md5sum: mgsc\_1240/e22001: Is a directory  
md5sum: mgsc\_1240/e22002: Is a directory  
md5sum: mgsc\_1240/e22003: Is a directory  
md5sum: mgsc\_1240/e22004: Is a directory  
md5sum: mgsc\_1240/e22005: Is a directory  
md5sum: mgsc\_1240/e22006: Is a directory  
md5sum: mgsc\_1240/e22007: Is a directory  
md5sum: mgsc\_1240/e22008: Is a directory  
md5sum: mgsc\_1240/e22009: Is a directory  
md5sum: mgsc\_1240/e22010: Is a directory  
md5sum: mgsc\_1240/e22011: Is a directory  
md5sum: mgsc\_1240/e22012: Is a directory  
md5sum: mgsc\_1240/index: Is a directory  
md5sum: mgsc\_1240/software: Is a directory  
md5sum: mgsc\_1241/catalog: Is a directory  
md5sum: mgsc\_1241/document: Is a directory  
md5sum: mgsc\_1241/e22012: Is a directory  
md5sum: mgsc\_1241/e22013: Is a directory  
md5sum: mgsc\_1241/e22014: Is a directory  
md5sum: mgsc\_1241/e22015: Is a directory  
md5sum: mgsc\_1241/e22016: Is a directory  
md5sum: mgsc\_1241/index: Is a directory  
md5sum: mgsc\_1241/software: Is a directory  
md5sum: mgsc\_1242/catalog: Is a directory  
md5sum: mgsc\_1242/document: Is a directory  
md5sum: mgsc\_1242/e23000: Is a directory  
md5sum: mgsc\_1242/e23001: Is a directory  
md5sum: mgsc\_1242/e23002: Is a directory  
md5sum: mgsc\_1242/e23003: Is a directory  
md5sum: mgsc\_1242/e23004: Is a directory  
md5sum: mgsc\_1242/e23005: Is a directory  
md5sum: mgsc\_1242/e23006: Is a directory

```
md5sum: mgsc_1242/e23007: Is a directory
md5sum: mgsc_1242/e23008: Is a directory
md5sum: mgsc_1242/e23009: Is a directory
md5sum: mgsc_1242/e23010: Is a directory
md5sum: mgsc_1242/e23011: Is a directory
md5sum: mgsc_1242/e23012: Is a directory
md5sum: mgsc_1242/e23013: Is a directory
md5sum: mgsc_1242/e23014: Is a directory
md5sum: mgsc_1242/index: Is a directory
md5sum: mgsc_1242/software: Is a directory
md5sum: mgsc_1243/catalog: Is a directory
md5sum: mgsc_1243/document: Is a directory
md5sum: mgsc_1243/index: Is a directory
md5sum: mgsc_1243/r01000: Is a directory
md5sum: mgsc_1243/r01001: Is a directory
md5sum: mgsc_1243/r01002: Is a directory
md5sum: mgsc_1243/r01003: Is a directory
md5sum: mgsc_1243/r01004: Is a directory
md5sum: mgsc_1243/r01005: Is a directory
md5sum: mgsc_1243/r01006: Is a directory
md5sum: mgsc_1243/r01007: Is a directory
md5sum: mgsc_1243/r01008: Is a directory
md5sum: mgsc_1243/r01009: Is a directory
md5sum: mgsc_1243/software: Is a directory
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_1243/*/* >
/rdata/jwang/MPGGA/checksum/dmgsc_1018/checksum_level3__mgsc134_new.out
md5sum: mgsc_1235/software/pcwin: Is a directory
md5sum: mgsc_1235/software/sunos: Is a directory
md5sum: mgsc_1236/software/pcwin: Is a directory
md5sum: mgsc_1236/software/sunos: Is a directory
md5sum: mgsc_1237/software/pcwin: Is a directory
md5sum: mgsc_1237/software/sunos: Is a directory
md5sum: mgsc_1238/software/pcwin: Is a directory
md5sum: mgsc_1238/software/sunos: Is a directory
md5sum: mgsc_1239/software/pcwin: Is a directory
md5sum: mgsc_1239/software/sunos: Is a directory
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_124*/*/* >
/rdata/jwang/MPGGA/checksum/dmgsc_1018/checksum_level3__mgsc124_new.out
md5sum: mgsc_1240/software/pcwin: Is a directory
md5sum: mgsc_1240/software/sunos: Is a directory
md5sum: mgsc_1241/software/pcwin: Is a directory
md5sum: mgsc_1241/software/sunos: Is a directory
md5sum: mgsc_1242/software/pcwin: Is a directory
md5sum: mgsc_1242/software/sunos: Is a directory
md5sum: mgsc_1243/software/pcwin: Is a directory
md5sum: mgsc_1243/software/sunos: Is a directory
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_1123/**/* >
/rdata/jwang/MMPGA/checksum/dmgsc_1018/checksum_level4__mgsc134_new.out
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_124/**/* >
/rdata/jwang/MMPGA/checksum/dmgsc_1018/checksum_level4__mgsc124_new.out
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_1243/**/* >
/rdata/jwangg/MPGA/checksum/dmgsc_1018/checksum_level5__mgsc134_new.out
md5sum: No match.
```

```
[jwang@starburst TEST0000000037.dat.dir]$ md5sum mgsc_124/**/* >
/rdata/jwangg/MPGA/checksum/dmgsc_1018/checksum_level5__mgsc124_new.out
md5sum: No match.
```

**Compare the checksum results from unpacked volumes vs. the baseline results by using “diff”. No difference was found, which indicate the splitter run was successful.**

```
[jwang@starburst TEST0000000037.dat.dir]$ cd /rdata/jwang/MPGA/checksum
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level1_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level1_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level2_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level2_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level3_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level3_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level4_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level4_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level5_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1001/checksum_level5_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level1_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level1_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level2__mgsc123_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level2__mgsc_123_orig.out
```

```
[jwang@starburst checksum]$ diff
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level2__mgsc124_new.out
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level2__mgsc_124_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc123_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc_123_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc124_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level3_mgsc_124_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc123_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc_123_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc124_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level4_mgsc_124_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc123_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc_123_orig.out
```

```
[jwang@starburst checksum]$ diff  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc124_new.out  
/rdata/jwang/MPGA/checksum/dmgsc_1018/checksum_level5_mgsc_124_orig.out
```